

C&EE 141

Construction Documents Overview

Construction Documents

- Construction documents define the work that is designed by the structural engineer
- Primary means of communication
- Typically define the finished structure, not the methods of construction

Construction Documents

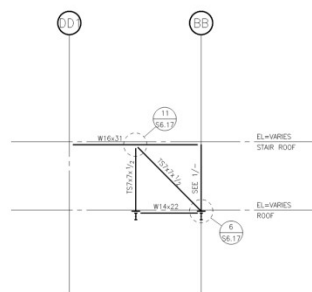
- Drawings
 - Graphical depiction of work
 - Callouts
 - Dimensions
 - Notes
- Specifications
 - Written description of requirements for work
- Calculations are not construction documents
 - They merely justify the design meets the project requirements

Drawing Overview

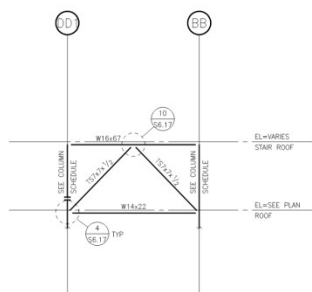
- Common Drawing Elements
- General Notes
- Plans
- Elevations
- Sections
- Column Schedules
- Details

Common Drawing Elements

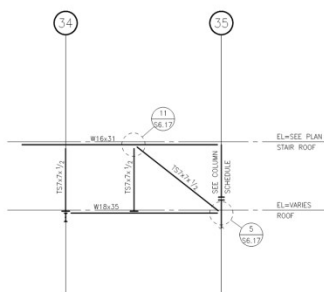
- Title Block
- Sheet name
- Sheet number
- Detail numbers
- Callouts



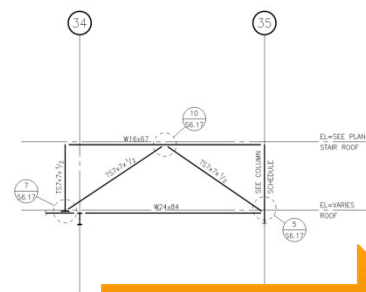
4 FRAME ELEV NORTH OF LINE 35
 $\frac{1}{8}'' = 1' - 0''$



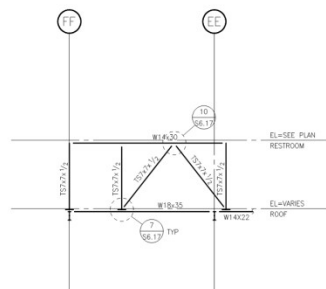
3 FRAME ELEV @ LINE 35
1/8" = 1'-0"



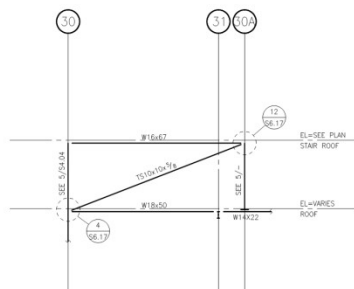
2 FRAME ELEV @ LINE DD1
1/8"=1'-0"



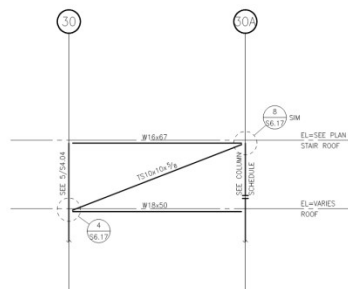
Title Block



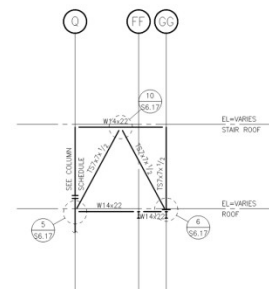
8 FRAME ELEV NORTH OF LINE 34
 $\frac{1}{8}'' = 1' - 0''$



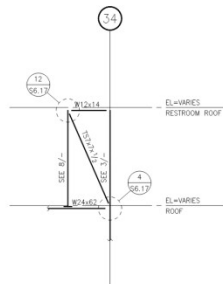
7 FRAME ELEV @ LINE GG
1/8"=1'-0"



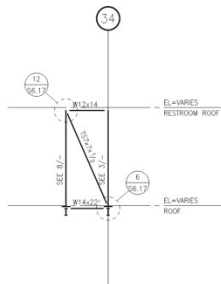
6 FRAME ELEV @ LINE Q
1/8"=1'-0"



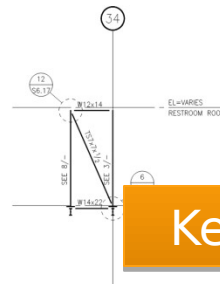
5 FRAME ELEV @ LINE 30A
 $\frac{1}{8}'' = 1' - 0''$



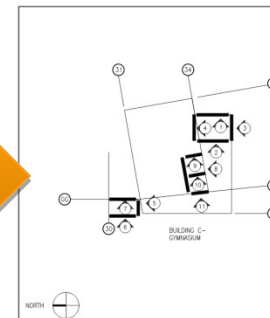
11 FRAME ELEV EAST @ FF $\frac{1}{8}"=1'-0"$



10 FRAME ELEV EAST OF LINE FF $\frac{1}{8}'' = 1' - 0''$



9 FRAME ELEV EAST OF LINE EE $\frac{1}{8}''=1'-0''$



Key Plan

Sheet Name

BUILDING C: GYMNASIUM
BRACED FRAME ELEVATIONS

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APR03- 104577
AC _____ FLS _____ SS _____
DATE _____



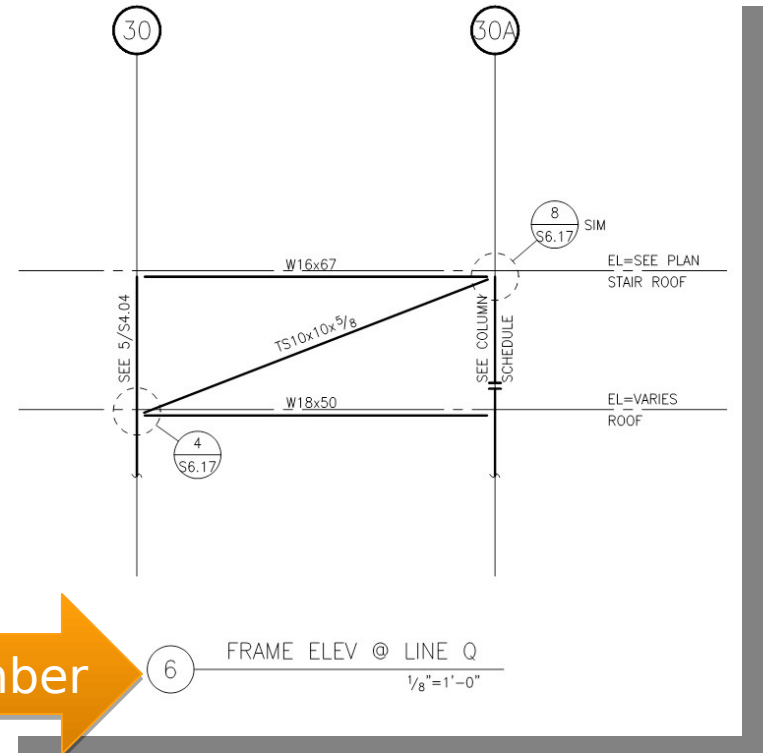
JOB #991481

1

S4.05

Sheet Number

Detail Number



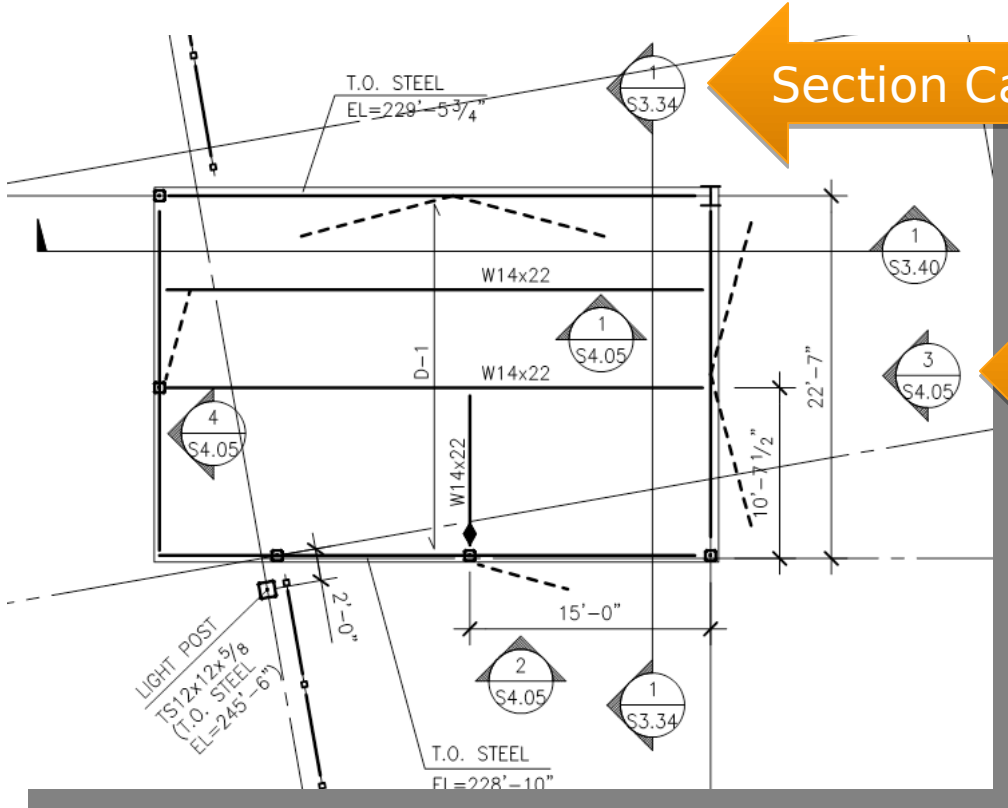
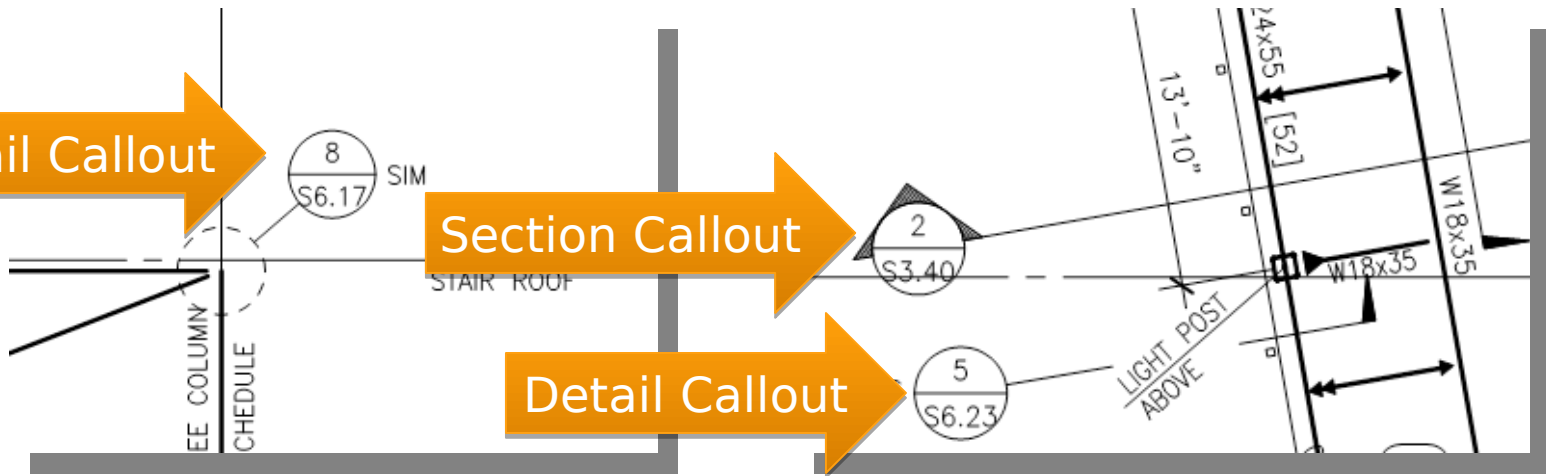
Detail Callout

Section Callout

Detail Callout

Section Callout

Elevation Callout



General Notes

- Provide general requirements of the project that apply to all sheets in the document
 - Code basis
 - Loading criteria
 - Material specifications
 - Limitations of scope, definition of responsibilities
 - Limitations or requirements for construction methods

STRUCTURAL NOTES

GENERAL

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO STARTING CONSTRUCTION. THE ARCHITECT SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES.
2. ALL DRAWINGS ARE CONSIDERED TO BE A PART OF THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REVIEW AND COORDINATION OF ALL DRAWINGS AND SPECIFICATIONS PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES THAT OCCUR SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO START OF CONSTRUCTION SO THAT A CLARIFICATION CAN BE ISSUED. ANY WORK PERFORMED IN CONFLICT WITH THE CONTRACT DOCUMENTS OR ANY CODE REQUIREMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT THEIR OWN EXPENSE AND AT NO EXPENSE TO THE OWNER OR ARCHITECT.
3. NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE GIVEN, CONSTRUCTION SHALL BE AS SHOWN FOR SIMILAR WORK.
4. ALL WORK SHALL CONFORM TO THE MINIMUM STANDARDS OF THE FOLLOWING CODES:

1998 CALIFORNIA BUILDING CODE VOLUME 2, TITLE 24, REFERRED TO HERE AS "THE CODE", AND ANY OTHER REGULATING AGENCIES WHICH HAVE AUTHORITY OVER ANY PORTION OF THE WORK, INCLUDING THE STATE OF CALIFORNIA DIVISION OF INDUSTRIAL SAFETY, AND THOSE CODES & STANDARDS LISTED IN THESE NOTES AND SPECIFICATIONS.

11. CONTRACTOR SHALL INVESTIGATE SITE DURING CLEARING AND EARTHWORK OPERATIONS FOR FILLED EXCAVATIONS OR BURIED STRUCTURES, SUCH AS CESSPOOLS, CISTERNS, FOUNDATIONS, ETC. IF ANY SUCH STRUCTURES ARE FOUND, STRUCTURAL ENGINEER SHALL BE NOTIFIED IMMEDIATELY.
12. CONSTRUCTION MATERIAL SHALL BE SPREAD OUT IF PLACED ON FRAMED ROOF OR FLOOR. LOAD SHALL NOT EXCEED THE DESIGN LIVE LOAD PER SQUARE FOOT. PROVIDE ADEQUATE SHORING AND/OR BRACING WHERE STRUCTURE HAS NOT ATTAINED DESIGN STRENGTH.
13. WIND ANALYSIS PER CHAPTER 16A DIVISION III OF THE CODE
BASIC WIND SPEED 70 MPH ($Q_s=12.6$ PSF)
EXPOSURE C
SPECIAL OCCUPANCY STRUCTURES ($I_w=1.00$)
14. SEISMIC ANALYSIS PER CHAPTER 16A DIVISION IV OF THE CODE,
UTILIZING RESPONSE SPECTRUM ANALYSIS.

Z	=	0.4	ZONE 4
I	=	1.15	SPECIAL OCCUPANCY STRUCTURE
R	=	6.4	SPECIAL CONCENTRIC BRACED FRAME

SEISMIC DESIGN PARAMETERS FOR BUILDINGS A, B, AND C IS BASED ON SOILS REPORT BY GEOSYSTEMS REPORT NO. GS00-110, DATED MARCH 3, 2000.

SEISMIC SOURCE TYPE = B
SOIL PROFILE = S_D

15. DESIGN LOADS PER LOADING CRITERIA SHEETS S0.11 TO S0.15.

SPECIAL INSPECTIONS

THE FOLLOWING ELEMENTS OF CONSTRUCTION SHALL HAVE CONTINUOUS INSPECTION BY A SPECIAL INSPECTOR APPROVED FOR THAT PURPOSE BY DSA.

1. CONCRETE.
2. BOLTS INSTALLED IN CONCRETE.
3. ALL STRUCTURAL WELDING, INCLUDING REINFORCING STEEL.
4. PLACING OF REINFORCING STEEL.
5. HIGH STRENGTH BOLTING.
6. STRUCTURAL MASONRY AND VENEER.
7. SEE GEOTECHNICAL ENGINEER'S REPORT FOR SPECIFIC INSPECTION REQUIREMENTS BY SOILS ENGINEER'S REPRESENTATIVE.
8. INSTALLATION OF EXPANSION ANCHORS
9. INSTALLATION OF ADHESIVE ANCHORS
10. INSTALLATION OF METAL DECK AND HEADED STUDS

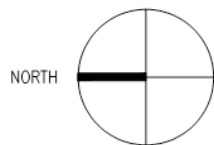
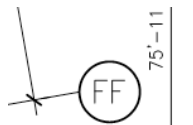
ALL SPECIAL INSPECTIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 1701A OF THE CODE AND ANY ADDITIONAL REQUIREMENTS STATED IN THESE DRAWINGS AND/OR THE PROJECT SPECIFICATIONS.





Plans

- Depiction of the structure in “plan” (horizontal view)
 - Horizontal control (grids, north arrow)
 - Horizontal framing (beams, girders, slabs)
 - Foundations
 - Callouts for sections, elevations and details
 - Sheet notes
- Typically one framing plan drawing per floor (unless floors are identical)



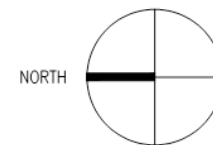
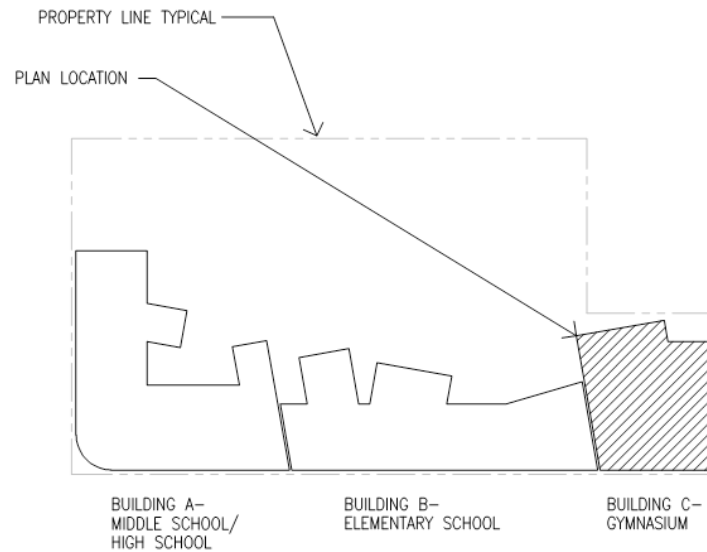
2



33.  INDICATES THE M.E.P. EQUIPMENT.
34. FOR HOUSEKEEPING PAD DETAIL SEE 6/S6.02
35. SEE 12/S6.01 FOR SIZE OF WT AT DEPRESSED FRAMING.
36.  INDICATES DOUBLER PLATE PER 5/S6.05.
37.  INDICATES A WELDED DRAG CONNECTION PER DETAIL 7/S6.05
38.  INDICATES AREA OF BUILT-UP SLAB PER 8/S7.10

NOTES

1



3

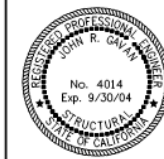
SCALE:
1/8" = 1'-0"

KEY PLAN

2

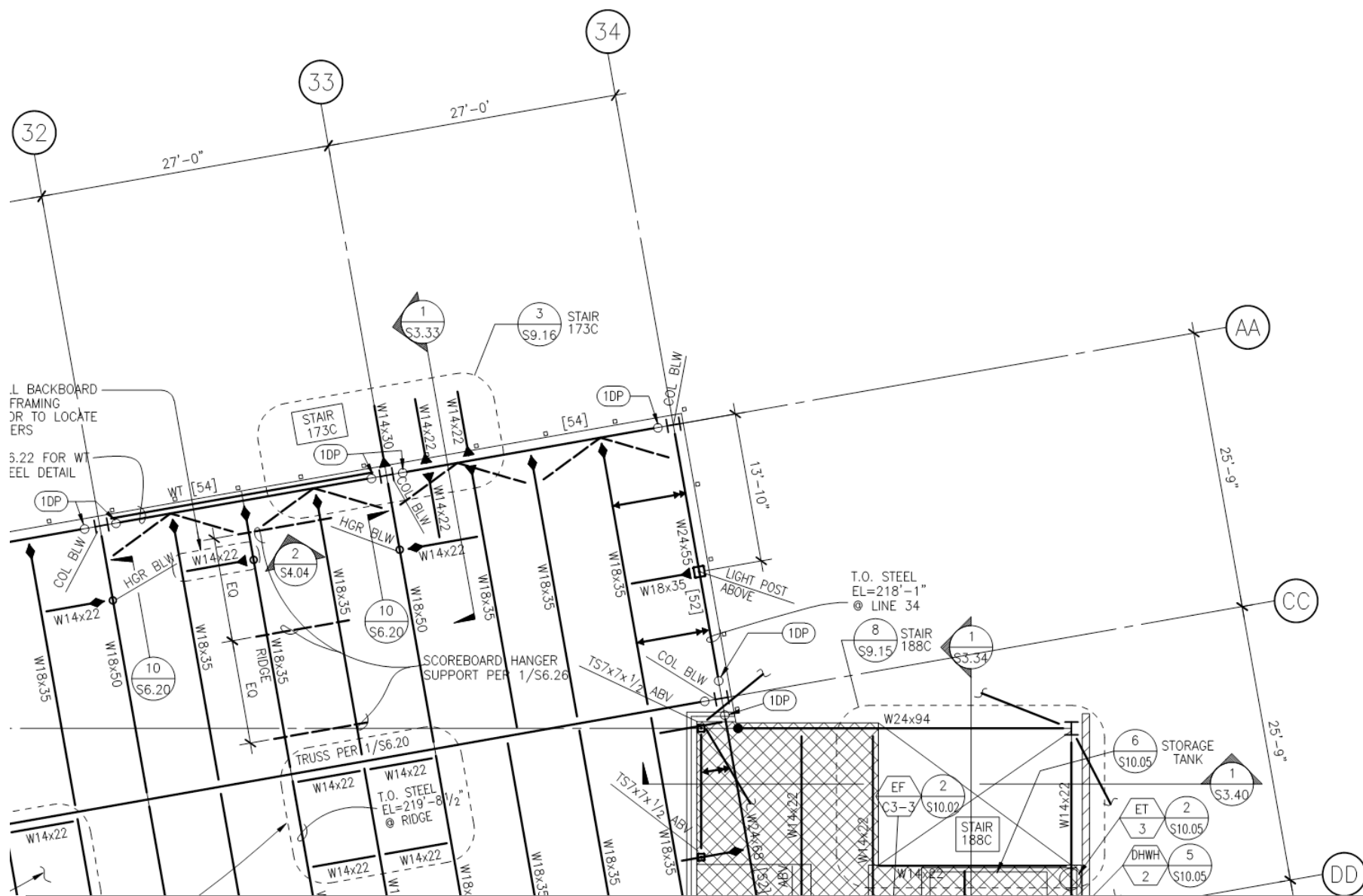
BUILDING C: GYMNASIUM THIRD FLOOR PLAN

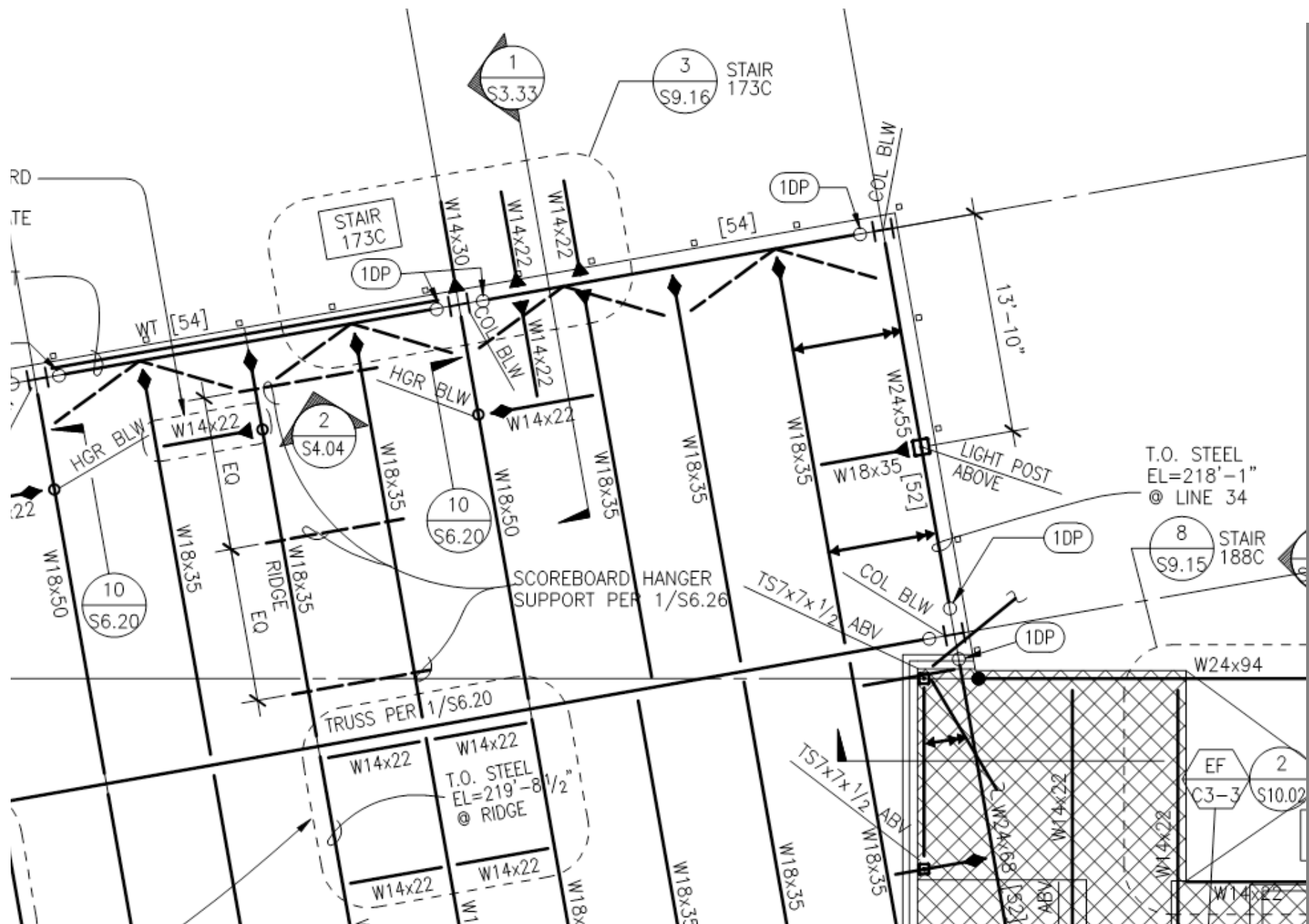
IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP03- 104577
AC FLS SS
DATE









JOB #991481

S2.13C.2





TYPICAL FRAMING NOTES:

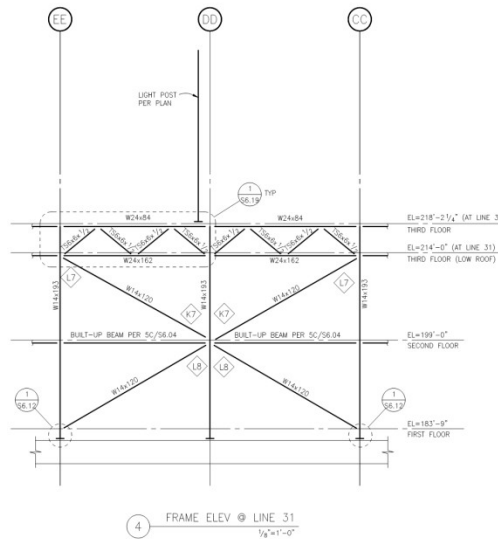
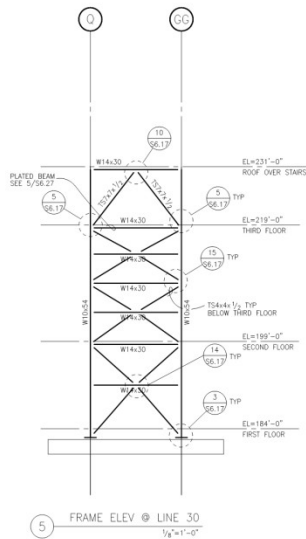
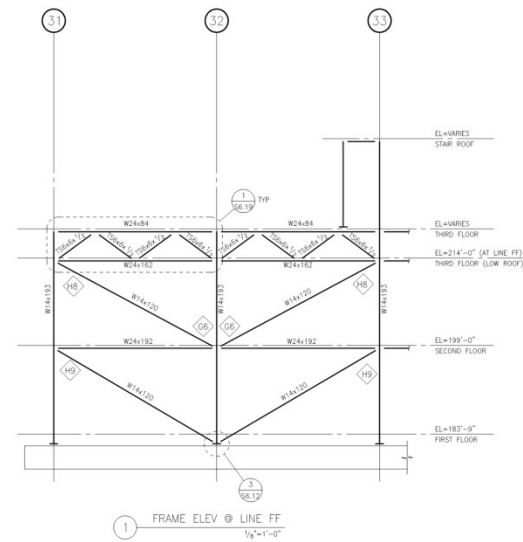
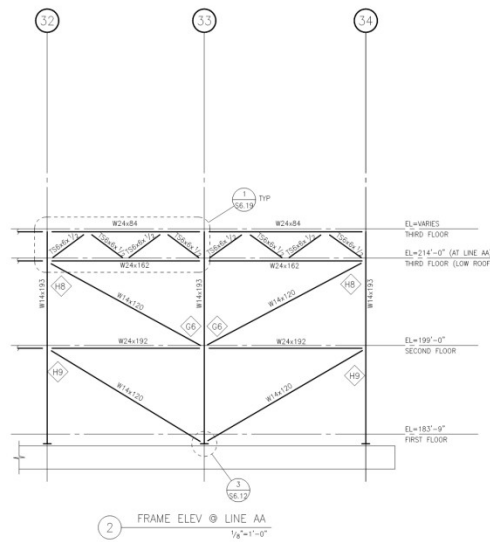
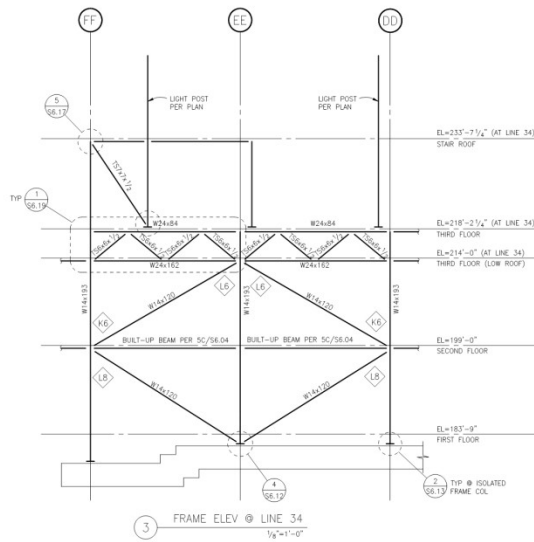
1. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN.
2. SEE SHEET S0.01 FOR GENERAL NOTES.
3. SEE MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR FLOOR PENETRATIONS NOT SHOWN.
4. SEE SHEETS S4.01 TO S4.05 FOR BRACED FRAME ELEVATIONS.
5. SEE SHEETS S5.01 TO S5.04 FOR THE COLUMN SCHEDULE.
6. SEE SHEETS S6.01 TO S6.04 FOR TYPICAL STEEL DETAILS.
7. SEE SHEETS S6.10 TO S6.19 FOR BRACED FRAME CONNECTION DETAILS.
8. SEE SHEETS S6.20 TO S6.29 FOR STEEL DETAILS.
9.  T.O.SLAB=X'-X" INDICATES TOP OF SLAB ELEVATION
T.O.STEEL=X'-X" INDICATES TOP OF STEEL ELEVATION
10. (-X") INDICATES TOP OF STEEL ELEVATION OF STEEL BEAM OR COLUMN WHERE BELOW THE REFERENCED TOP OF STEEL ELEVATION INDICATED BY

$$\frac{\text{T.O.SLAB} = X' - X''}{\text{T.O.STEEL} = X' - X''}$$
11.  INDICATES FLOOR ELEVATION CHANGE.
12.  INDICATES CONCRETE CURB AND FLOOR ELEVATION CHANGE.
13.  INDICATES CONCRETE FILL ON METAL DECK TYPE PER 13/S6.02
14. ALL BEAMS TO BE EQUALLY SPACED BETWEEN COLUMNS UNLESS NOTED OTHERWISE.
15.  INDICATES # OF BOLTS REQUIRED AT BEAM CONNECTION. SEE DETAIL 1/S6.01 NOTE #7.
16. [#] INDICATES # OF SHEAR STUDS REQUIRED. PROVIDE A MINIMUM OF ONE STUD PER FOOT TYPICAL ON ALL BEAMS WHERE STUDS AS INDICATED BY [#], ARE NOT SHOWN. SEE DETAILS 3, 4, AND 5 ON S6.02.

Elevations

- Depiction of the structure in “elevation” (vertical view)
 - Walls, wall reinforcement
 - Frames
 - Frame connection detail references

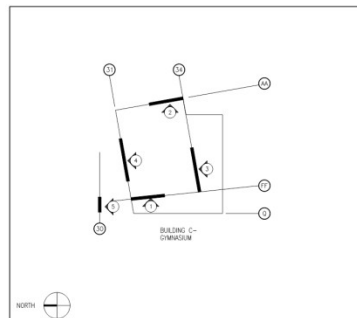
SHEET NO. 001
 DATE: 08/15/2017
 PROJECT: THE ACCELERATED SCHOOL
 114 LOS ANGELES, CALIFORNIA 90011
 DRAWN BY: J. L. BROWN
 CHECKED BY: J. L. BROWN
 DESIGNED BY: J. L. BROWN
 APPROVED BY: J. L. BROWN
 SCALE: 1/8" = 1'-0"
 NOTES: SEE PLAN & ELEVATION FOR DETAILS OF BRACED FRAME.

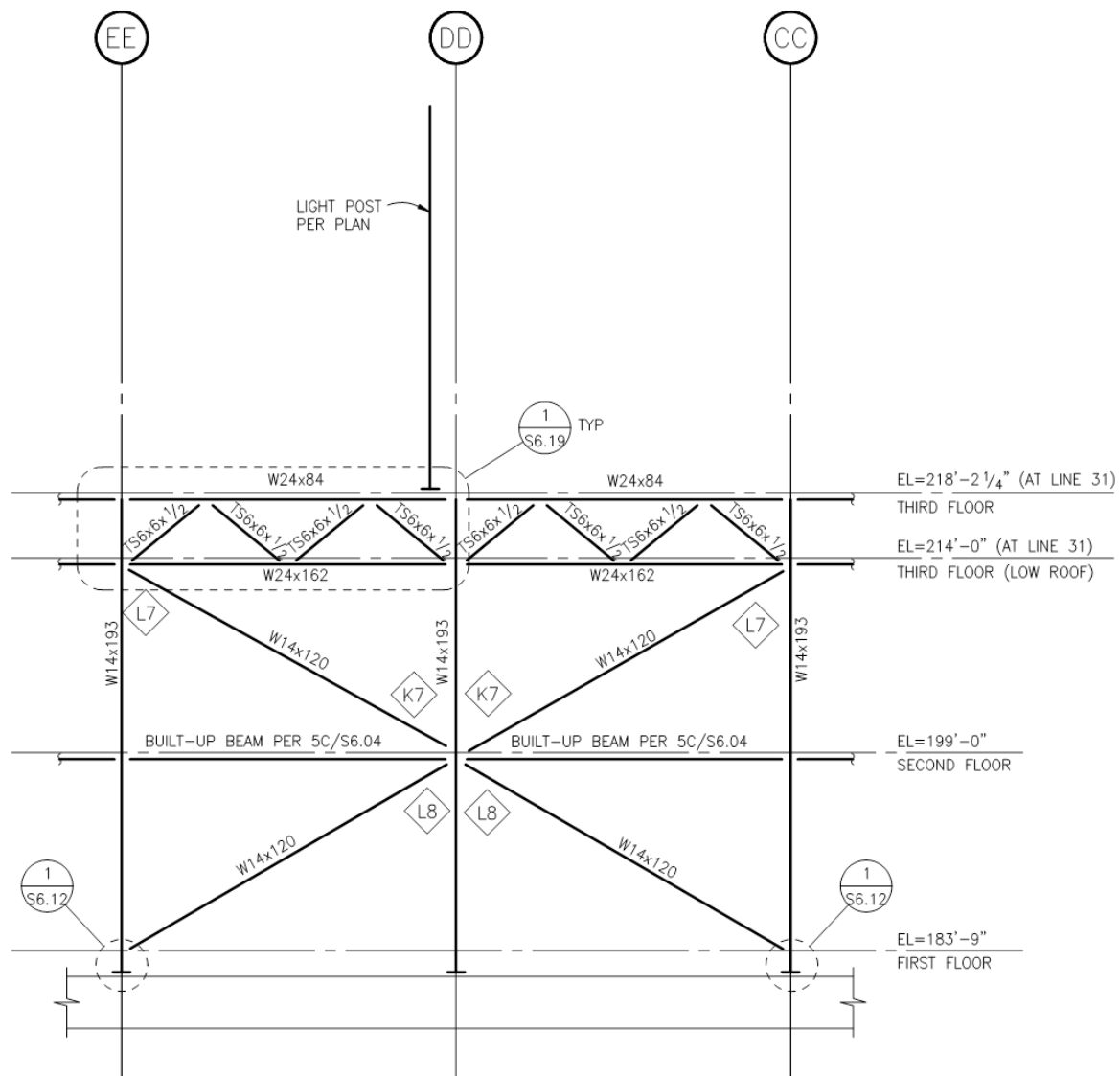
FRAME ELEVATIONS



INDICATES BRACE CONNECTION ID PER DETAILS ON SHEETS 56.10 THROUGH 56.16 (LETTER = CONNECTION TYPE, NUMBER = CASE ID)

NOTE: FLOOR ELEVATIONS SHOWN ARE FOR THE SPECIFIC BRACE FRAMES. FOR TYPICAL FLOOR ELEVATIONS, REFER TO FLOOR PLANS.

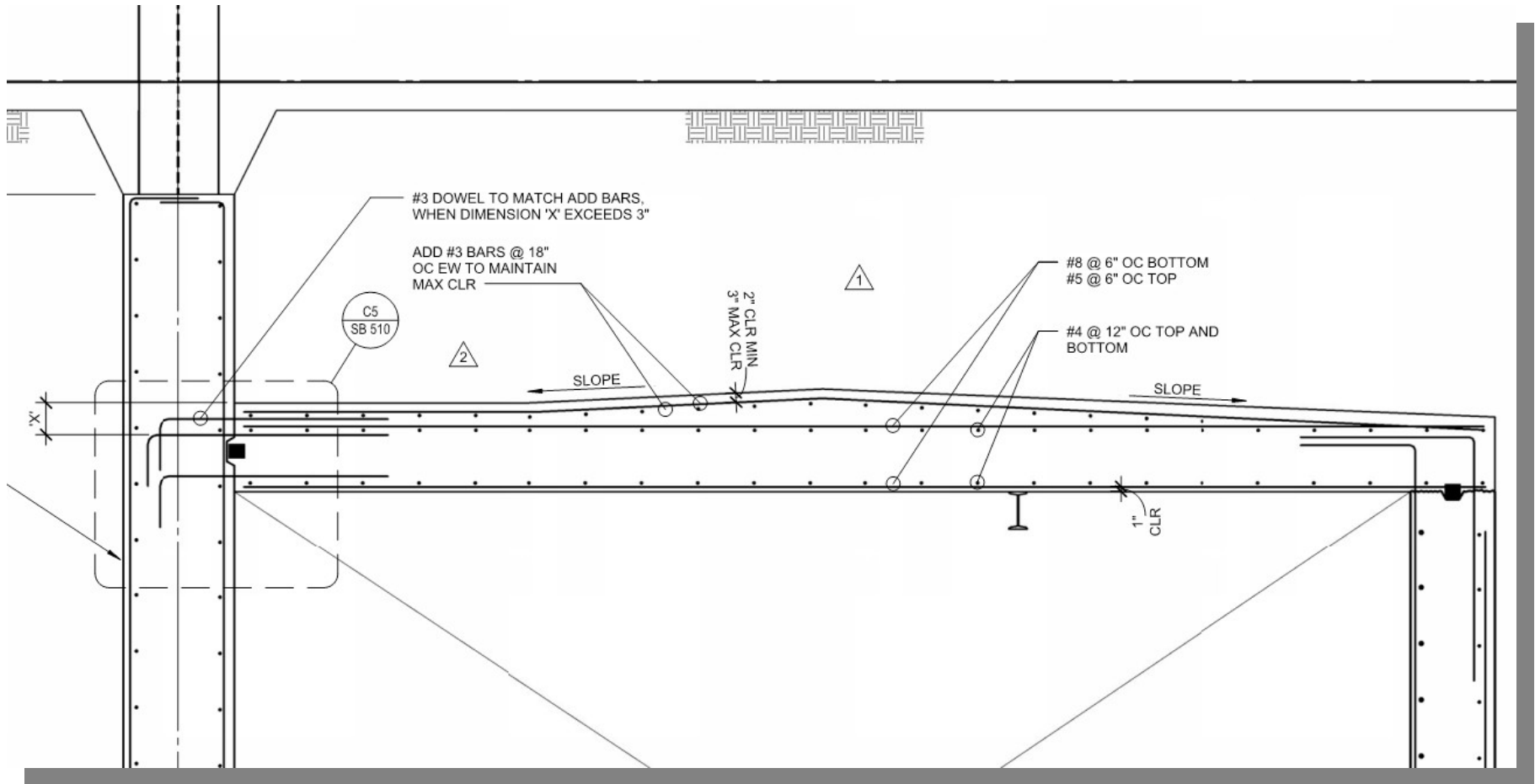




4 FRAME ELEV @ LINE 31
1/8"=1'-0"

Sections

- Depiction of the structure, or specific elements of the structure, in cross-section
 - Building sections
 - Wall sections
 - Foundation sections
 - Detailed sections
- General configuration/arrangements of elements
- Call out steel connection details
- Concrete reinforcement



Column Schedules

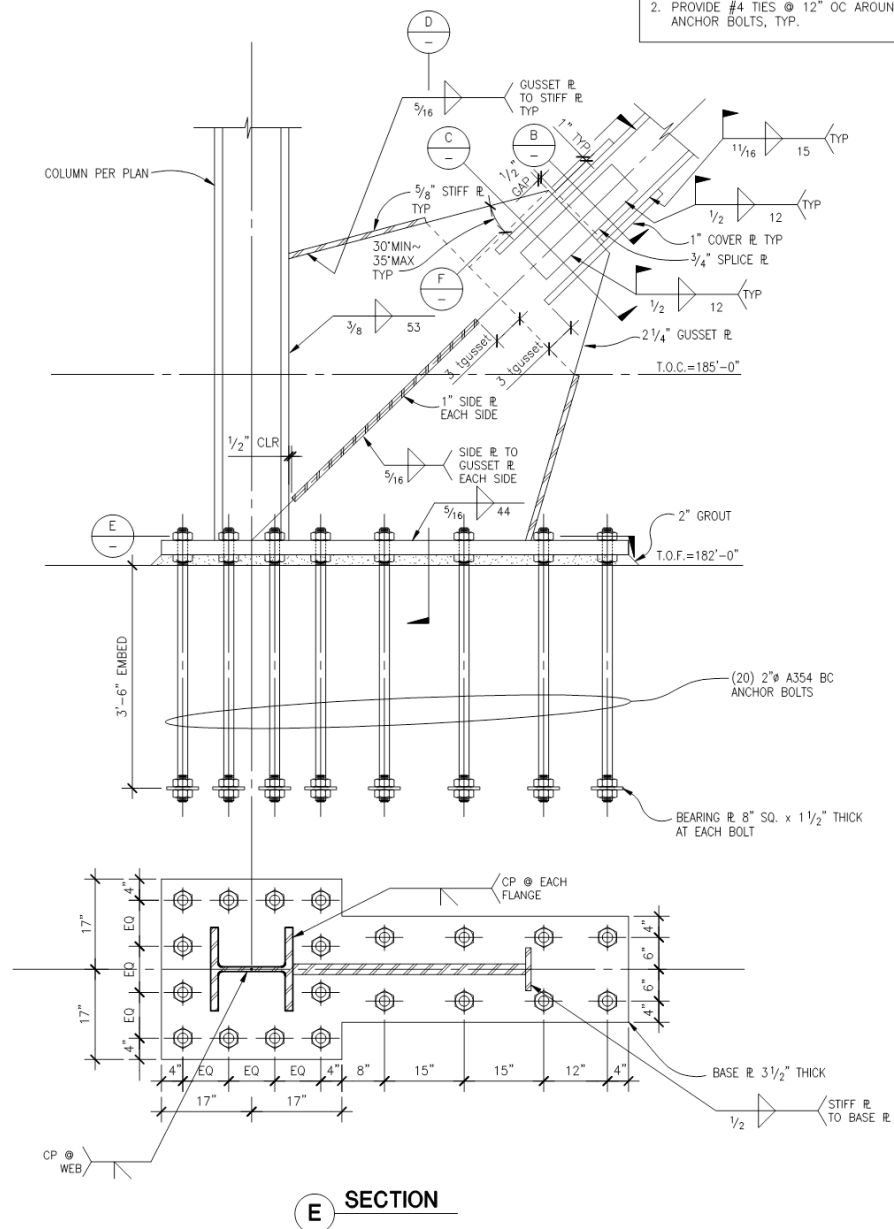
- Depiction of the building columns in elevation
 - Identified by grid intersection (A/1, G/14, etc.)
 - Call out sections by vertical location along column shaft
 - Splice and base plate detail callouts

GYMNASIUM BUILDING

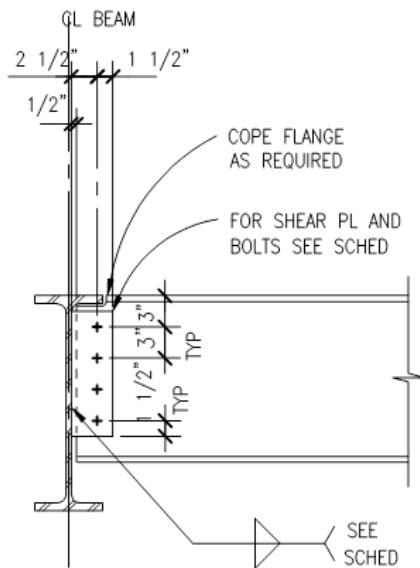
[illegible]

Details

- Smaller sections, elevations and plans with requirements for specific elements of the structure
 - Steel connections (bolts, welds, plates, etc.)
 - Concrete member cross-sections (beam reinforcement)
 - How to build misc/minor elements (curbs, depressions, steps, etc.)
 - Stairs, elevators, exterior wall interfaces, etc.
- “Typical Details” apply throughout project
 - Example: Typical beam connections
- Atypical details apply only where called out

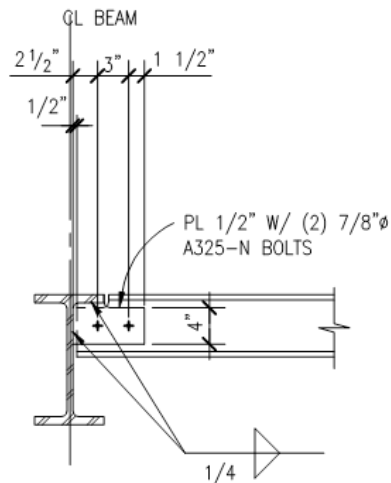


- 1



BEAM TO BEAM

D



W6 OR C6 CONNECTION

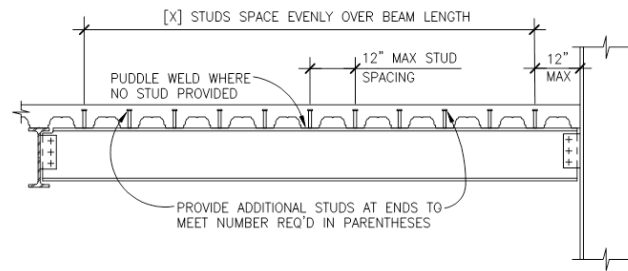
E

STANDARD BOLTED CONNECTION SCHEDULE

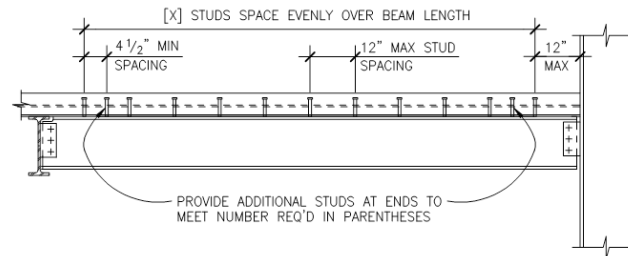
BEAM SIZE	NO. & SIZE OF BOLTS REQUIRED	PLATE THICKNESS	WELD SIZE	CONN. CAPACITY (SINGLE SHEAR)
W8 C8	(2) 7/8"Ø	1/4"	1/4"	11.1K
W10 C10	(2) 7/8"Ø	1/4"	1/4"	11.1K
W12 C12	(3) 7/8"Ø	1/4"	1/4"	22.1K
W14	(3) 7/8"Ø	1/4"	1/4"	22.1K
W16	(4) 7/8"Ø	5/16"	1/4"	35.4K
W18	(4) 7/8"Ø	5/16"	1/4"	35.4K
W21	(5) 7/8"Ø	5/16"	1/4"	49.1K
W24	(6) 7/8"Ø	3/8"	5/16"	62.7K
W27	(7) 7/8"Ø	3/8"	5/16"	76.4K
W30	(8) 7/8"Ø*	7/16"	3/8"	83.9K
W33	(9) 7/8"Ø*	7/16"	3/8"	91.2K
W36	(9) 7/8"Ø*	7/16"	3/8"	91.2K

CONNECTION NOTES:

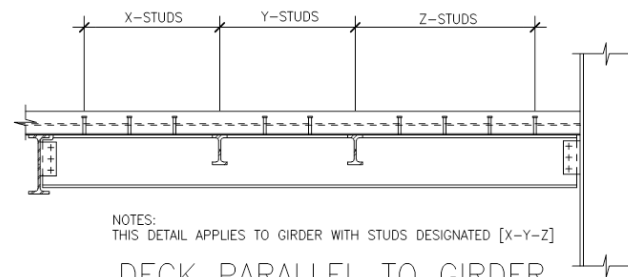
1. ALL BOLTS TO BE ASTM A325-N AND FULLY PRETENSIONED PER AISC STANDARDS EXCEPT AS DESCRIBED IN NOTE 2.
2. BOLTS IN BEAM TO BEAM CONNECTIONS SHALL BE TIGHTENED TO AISC "SNUG TIGHT" CONDITION UNLESS NOTED OTHERWISE



DECK PERPENDICULAR OR SKEWED TO BEAM



DECK PARALLEL TO BEAM

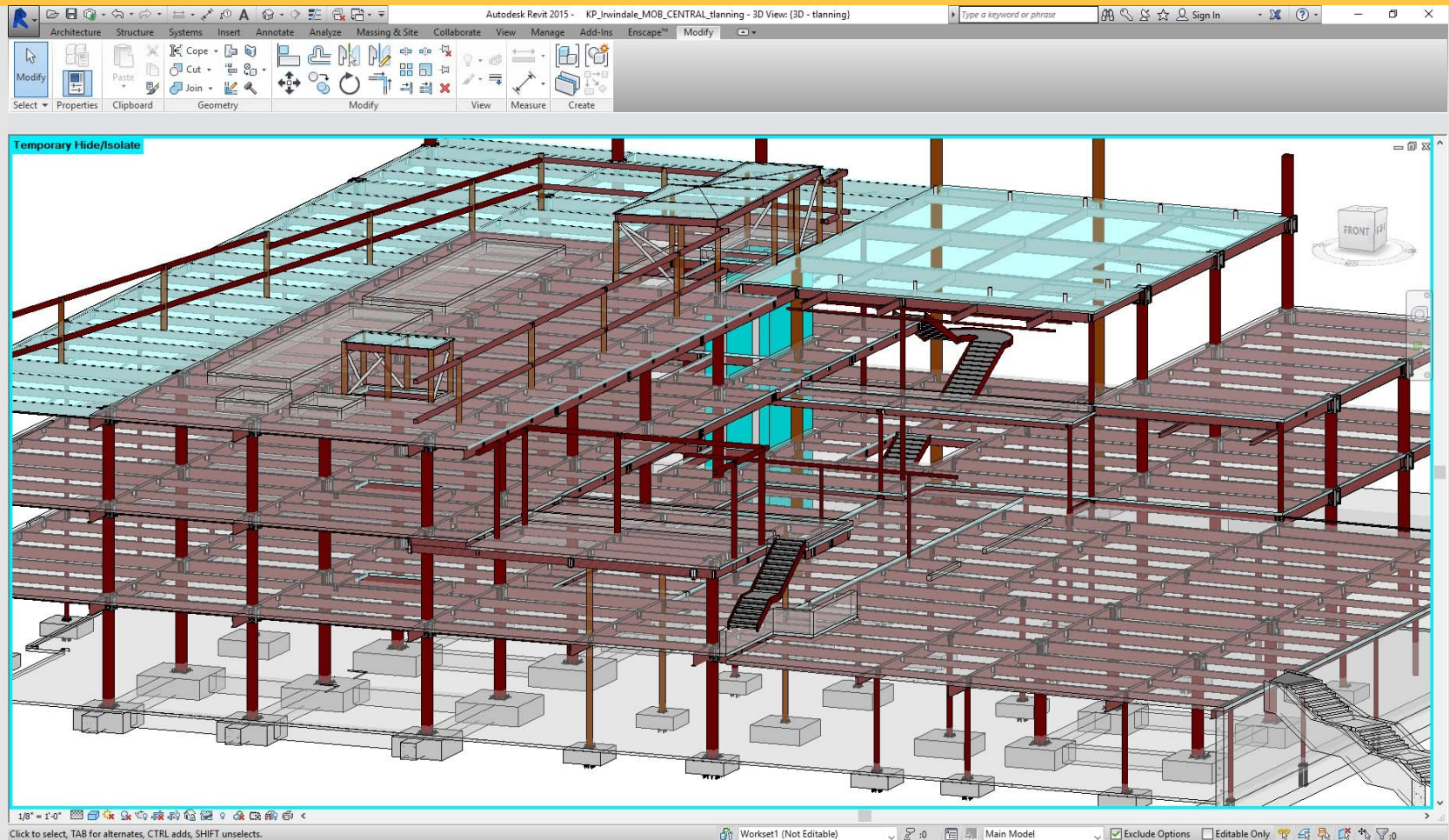


NOTES:
THIS DETAIL APPLIES TO GIRDER WITH STUDS DESIGNATED [X-Y-Z]

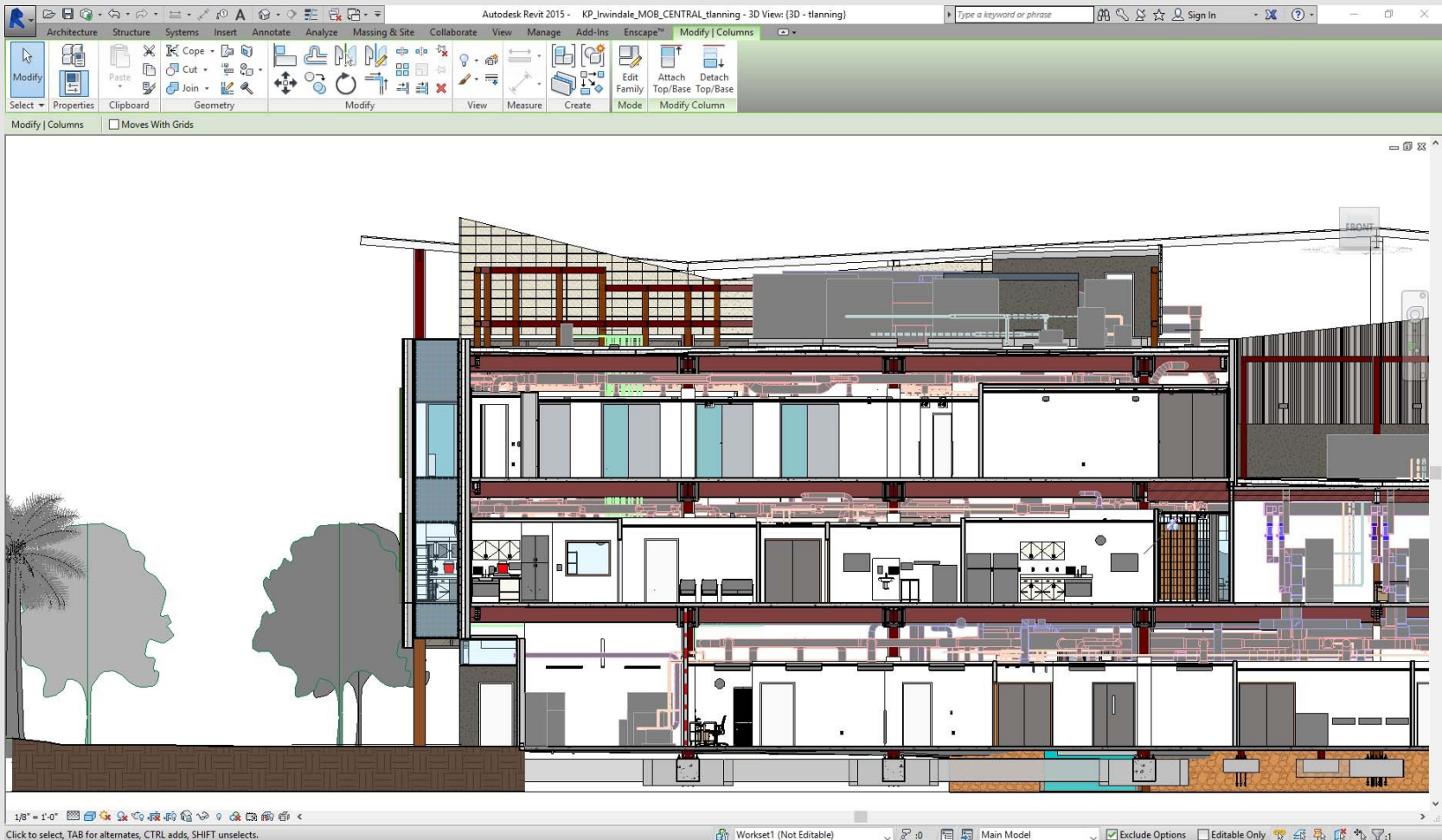
DECK PARALLEL TO GIRDER

- NOTES:
1. IF TWO STUDS ARE REQUIRED IN ONE FLUTE THE TRANSVERSE SPACING SHALL BE 3" MINIMUM
 2. UNLESS NOTED [O] ALL BEAMS AND GIRDERS THAT SUPPORT STRUCTURAL CONCRETE HAVE $\frac{3}{4}$ " ϕ x5" LONG HEADED SHEAR STUDS @ 12" OC (MAX)
 3. STAGGER STUDS AS REQUIRED TO AVOID CONFLICT WITH GUSSET PLATES.

Revit and 3D



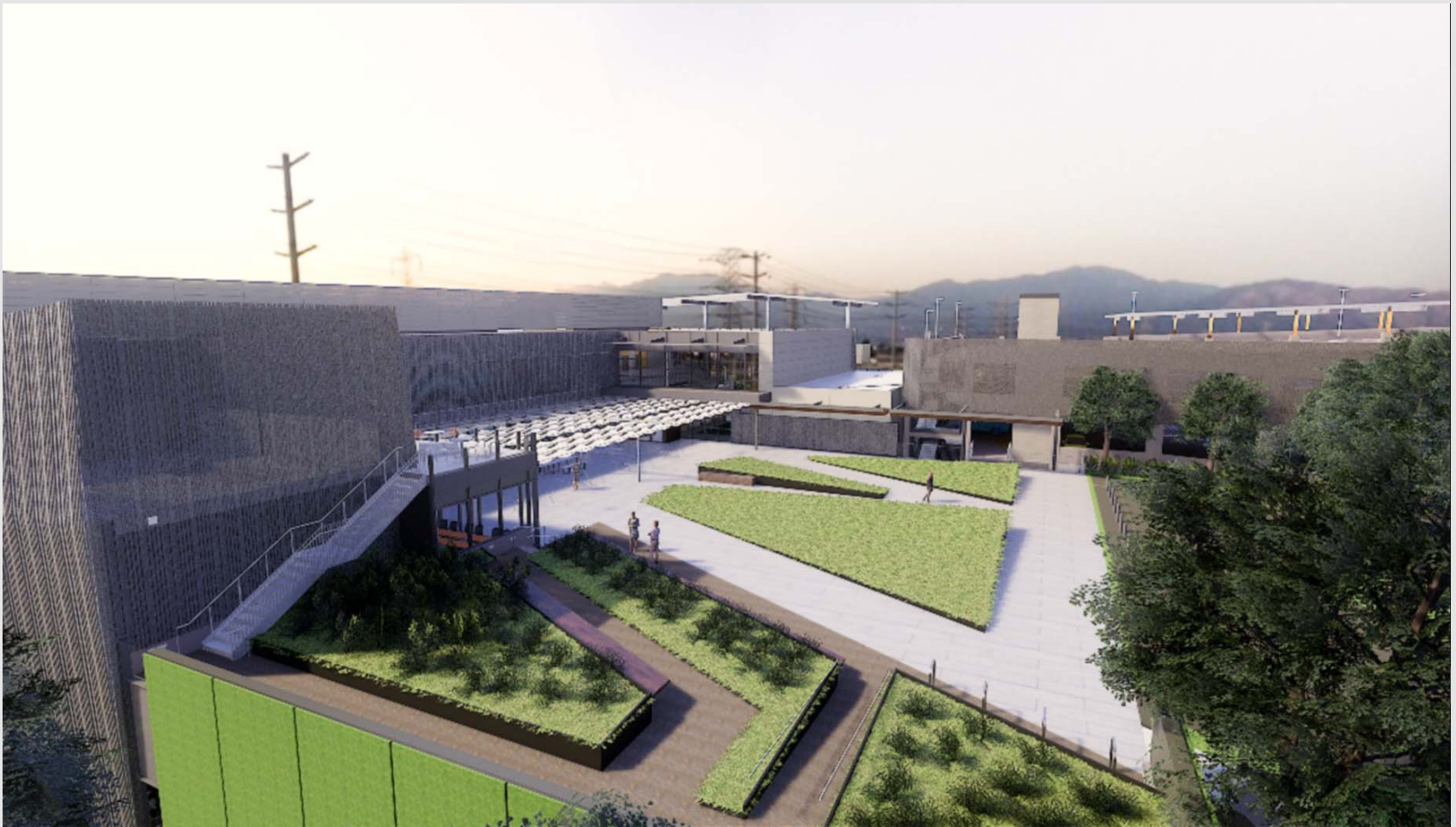
Revit and 3D



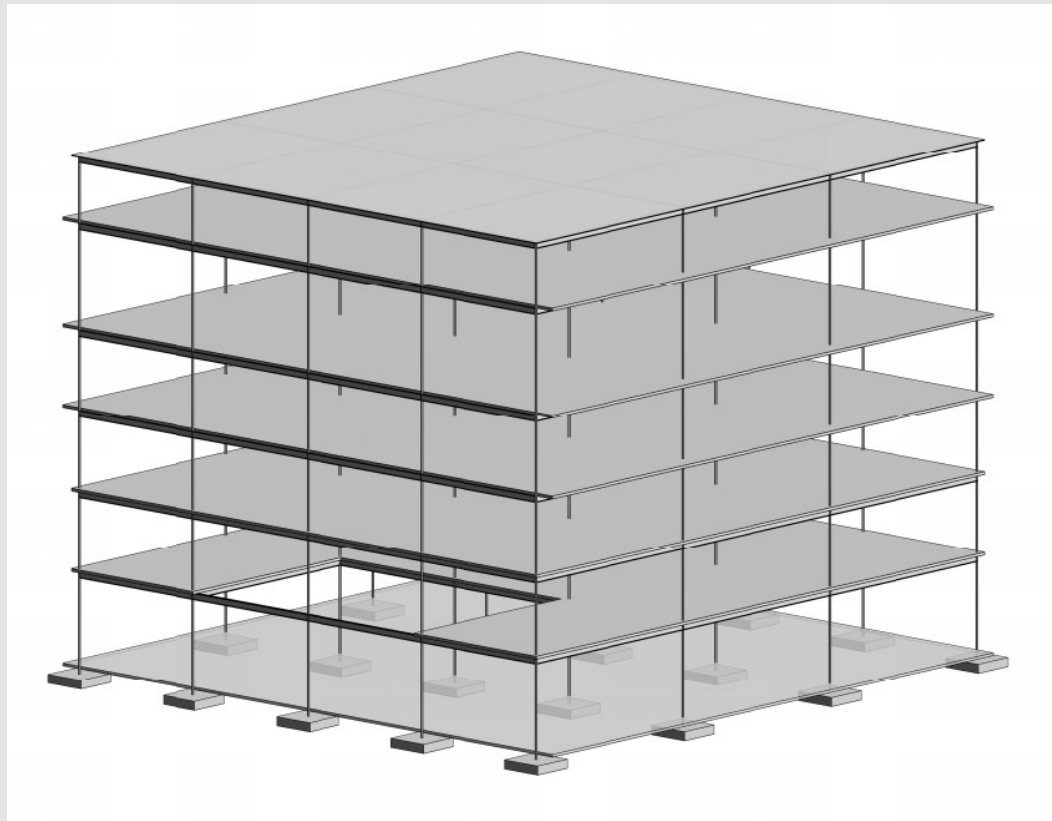
Revit and 3D



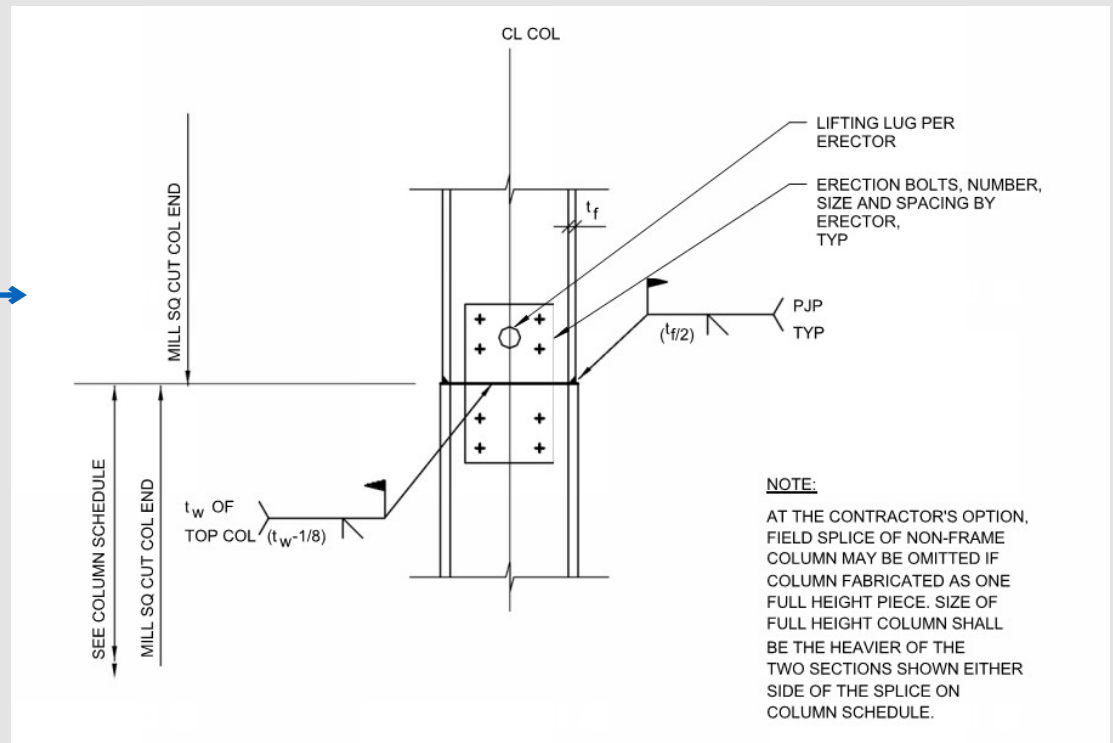
Revit and 3D



Class Project



W14X109	LEVEL 05
	192' - 1"
	LEVEL 04
	176' - 1"
W14X132	LEVEL 02
	156' - 9"
	LEVEL 01
	140' - 9"
	(N) TOP OF PILE
	128' - 9"



Good Calcs...

kp11 Consulting Engineers 6080 Center Drive, Suite 300 Los Angeles, California 90045 (310) 465-1536 Fax (310) 465-0370	project	HCA Riverside	by	KCP	sheet no.
	location	Riverside, CA	date	1/6/13	
	client	P+W	job no.	112206	
	Drag Connection - Strong Axis				

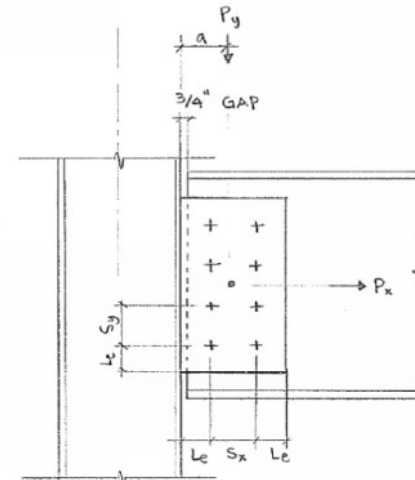
DRAG/CHORD CONNECTION - STRONG AXIS (AISC 360-05) ONE OR TWO EQUAL ROWS OF BOLTS

W24x62 Typ - HCA

DESIGN PARAMETERS

DB1

Bolts	Bolt Type	A490N
	Bolt Diameter d	1 in
Bolt Geometry	Bolt F _{nv}	60 ksi
	μ (Mean Slip Coeff. Class A Surfaces)	0.35
	T _b = Min. Bolt Pre-Tension	64 kips
	No. of bolt lines (1) or (2)	2
	(12 max) bolts per line	6 bolts
	(24 max) total n	12 bolts
	s _x = 3 φ _{bol}	3 in
	s _y = btwn (2.67 & 3) φ _{bol}	3 in
	Min Edge Dist L _e	1.75 in (Table J3.4)
	dist from face of col to bolt group centroid = a	4.0 in
Tab Plate	dist btwn face of col web to bolt group centroid = e _b	11.79 in
	e _y	0 in
	(1) Single or (2) Double Tab Plate	1
	h _{tp} = (bolts/line-1)s _y +2L _e	18.5 in
	Tab Plate Thickness t _p	5/8 in
	Tab Plate F _y	50 ksi
	Tab Plate F _u	65 ksi
	Weld @ Tab & Column	1/2 in



Block Shear: [2 Vertical Lines • 1 Horizontal Line]

$$\phi R_{cs,y} = \phi \{ 0.6 A_{nv,y} F_u + U_{bs} A_{nt,y} F_u \} \leq \phi \{ 0.6 A_{gv,y} F_y + U_{bs} A_{nt,y} F_u \} = 552 \text{ kips} \quad 2.03$$

where;

$$A_{nv,y} = t_{plate} \times \text{no. of plates} \{ L_e - (d_o + 1/8) / 2 + (\text{bolts per line} - 1) \times (s_y - (d_o + 1/8)) \} \times \text{no. of bolt lines}$$

$$= 17.9 \text{ in}^2$$

$$A_{nt,y} = \text{One Line of Bolts: } t_{plate} \times \text{no. of plates} \{ L_e - (d_o + 1/8) / 2 \}$$

$$= \text{Two Line of Bolts: } t_{plate} \times \text{no. of plates} \{ S_x - (d_o + 1/8) \}$$

$$= 1.2 \text{ in}^2$$

$$A_{gv,y} = t_{plate} \times \text{no. of plates} \{ L_e + (\text{bolts per line} - 1) \times s_y \} \times \text{no. of bolt lines}$$

$$= 28.4 \text{ in}^2$$

$$U_{bs} = 1.0 \text{ IF 1 LINE OF BOLTS ; } 0.5 \text{ IF 2 LINES OF BOLTS}$$

$$= 0.5$$

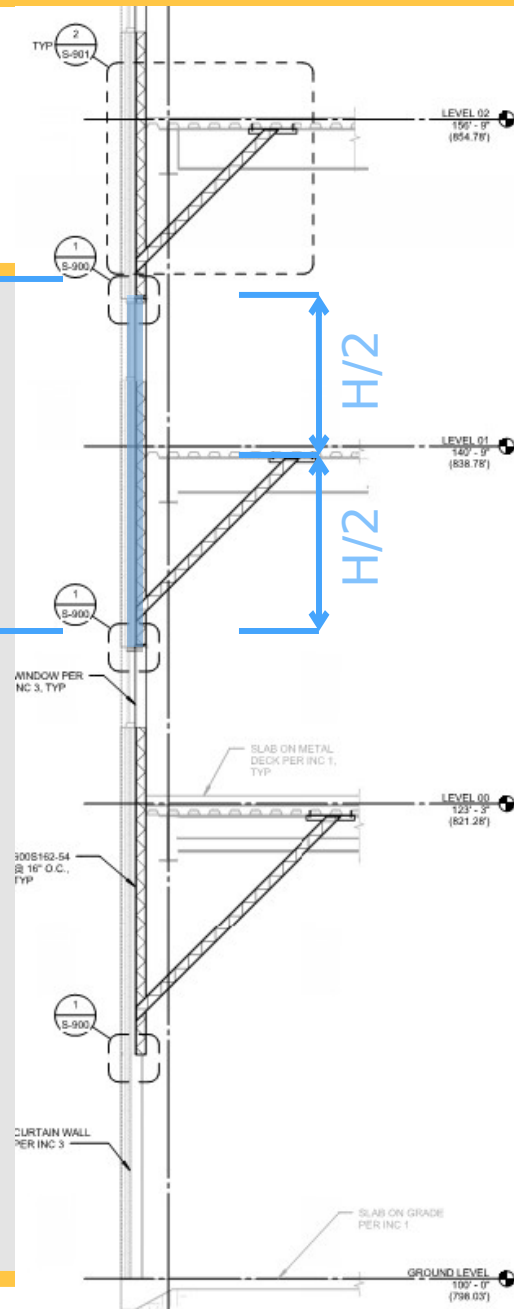
$$\phi = 0.75$$

Bad Calcs...

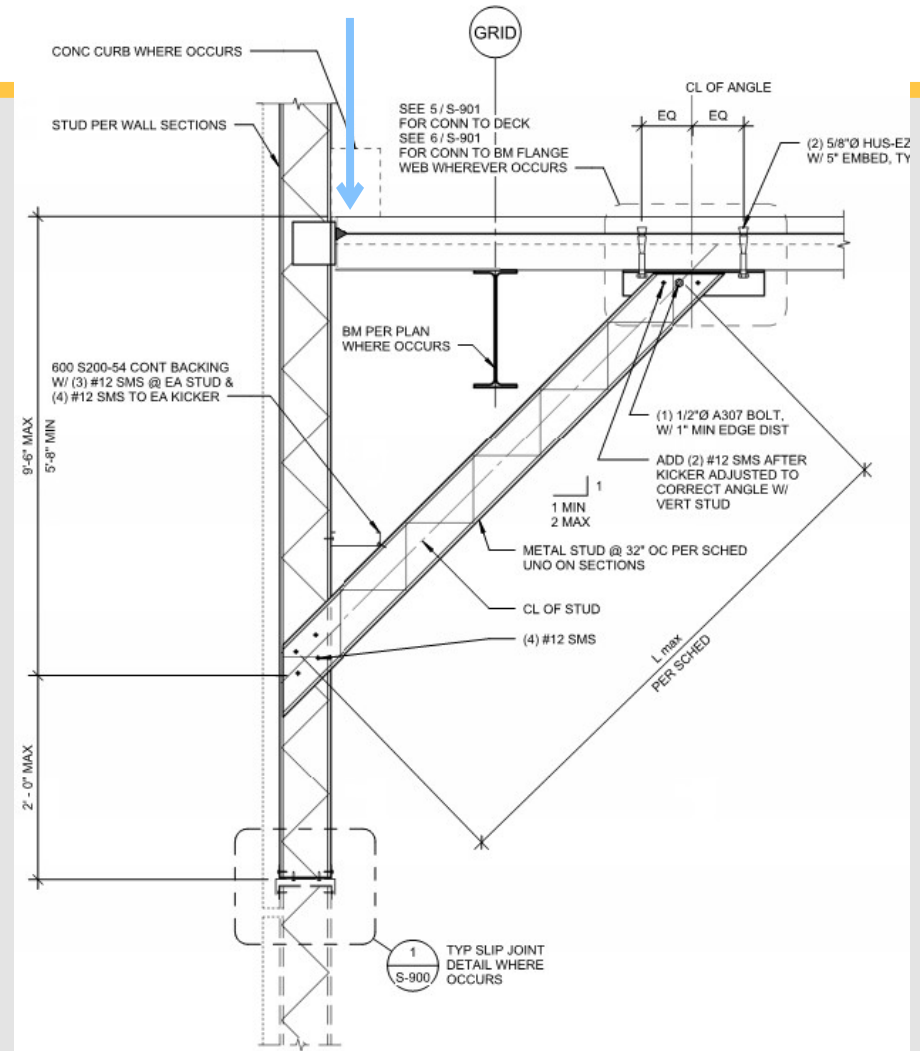
Column ID	Column Size	Column Story	Height in	Height out	X/Y	Fy	Qo	A (in ²)	I (in ⁴)	Z (in ³)	rx (in)	ry (in)	M1/M2	Cm	K1	Pe1	SPECXSC	SPECYSC	14D05L	Pr
C5PENTHOUSE	W36X330	C5	PENTHOUSE	192	192 X	50	3	97 23300	1410	15.5	3.83	0.282	0.487	1.0	180905.3	30	4	251	28	
C5STORY6	W36X330	C5	STORY6	192	192 X	50	3	97 23300	1410	15.5	3.83	0.969	0.212	1.0	180905.3	77	8	348	42	
C5STORY5	W36X395	C5	STORY5	192	192 X	50	3	116 28500	1710	15.7	3.88	0.720	0.312	1.0	221279	154	13	446	60	
C5STORY4	W36X395	C5	STORY4	232	232 X	50	3	116 28500	1710	15.7	3.88	0.922	0.231	1.0	151553.7	251	17	547	79	
C5STORY2	W36X529	C5	STORY2	192	192 X	50	3	156 39600	2330	16	4	0.999	0.201	1.0	307461.3	358	21	648	100	
C5STORY1	W36X529	C5	STORY1	210	210 X	50	3	156 39600	2330	16	4	0.831	0.268	1.0	257012.6	468	25	777	124	
C5BASEMENT	W36X529	C5	BASEMENT	297	279 X	50	3	156 39600	2330	16	4	0.578	0.369	1.0	128493.2	581	28	1194	177	
C5GRADEBM	W36X529	C5	GRADEBM	72	72 X	50	3	156 39600	2330	16	4	0.000	0.600	1.0	2186392	686	32	1208	189	
C6PENTHOUSE	W36X330	C6	PENTHOUSE	192	192 X	50	3	97 23300	1410	15.5	3.83	0.514	0.394	1.0	180905.3	5	1	240	24	
C6STORY6	W36X330	C6	STORY6	192	192 X	50	3	97 23300	1410	15.5	3.83	0.905	0.238	1.0	180905.3	10	2	336	34	
C6STORY5	W36X395	C6	STORY5	192	192 X	50	3	116 28500	1710	15.7	3.88	0.902	0.239	1.0	221279	15	2	437	45	
C6STORY4	W36X395	C6	STORY4	232	232 X	50	3	116 28500	1710	15.7	3.88	0.923	0.231	1.0	151553.7	18	3	541	55	
C6STORY2	W36X529	C6	STORY2	192	192 X	50	3	156 39600	2330	16	4	0.975	0.210	1.0	307461.3	21	3	645	66	
C6STORY1	W36X529	C6	STORY1	210	210 X	50	3	156 39600	2330	16	4	0.862	0.255	1.0	257012.6	23	2	776	79	
C6BASEMENT	W36X529	C6	BASEMENT	297	279 X	50	3	156 39600	2330	16	4	0.754	0.298	1.0	128493.2	20	1	1085	110	
C6GRADEBM	W36X529	C6	GRADEBM	72	72 X	50	3	156 39600	2330	16	4	0.000	0.600	1.0	2186392	16	1	1101	111	
C7PENTHOUSE	W36X330	C7	PENTHOUSE	192	192 X	50	3	97 23300	1410	15.5	3.83	0.521	0.392	1.0	180905.3	0	1	236	23	
C7STORY6	W36X330	C7	STORY6	192	192 X	50	3	97 23300	1410	15.5	3.83	0.905	0.238	1.0	180905.3	0	2	333	33	
C7STORY5	W36X395	C7	STORY5	192	192 X	50	3	116 28500	1710	15.7	3.88	0.893	0.243	1.0	221279	0	2	436	43	
C7STORY4	W36X395	C7	STORY4	232	232 X	50	3	116 28500	1710	15.7	3.88	0.924	0.230	1.0	151553.7	0	3	541	54	
C7STORY2	W36X529	C7	STORY2	192	192 X	50	3	156 39600	2330	16	4	0.979	0.208	1.0	307461.3	0	2	648	65	
C7STORY1	W36X529	C7	STORY1	210	210 X	50	3	156 39600	2330	16	4	0.880	0.248	1.0	257012.6	1	2	755	75	
C7BASEMENT	W36X529	C7	BASEMENT	297	279 X	50	3	156 39600	2330	16	4	0.745	0.302	1.0	128493.2	1	1	886	88	
C7GRADEBM	W36X529	C7	GRADEBM	72	72 X	50	3	156 39600	2330	16	4	0.000	0.600	1.0	2186392	0	1	906	90	
C8PENTHOUSE	W36X330	C8	PENTHOUSE	192	192 X	50	3	97 23300	1410	15.5	3.83	0.521	0.392	1.0	180905.3	1	1	234	23	
C8STORY6	W36X330	C8	STORY6	192	192 X	50	3	97 23300	1410	15.5	3.83	0.905	0.238	1.0	180905.3	1	2	331	33	
C8STORY5	W36X395	C8	STORY5	192	192 X	50	3	116 28500	1710	15.7	3.88	0.894	0.242	1.0	221279	1	2	431	43	
C8STORY4	W36X395	C8	STORY4	232	232 X	50	3	116 28500	1710	15.7	3.88	0.922	0.231	1.0	151553.7	1	3	535	53	
C8STORY2	W36X529	C8	STORY2	192	192 X	50	3	156 39600	2330	16	4	0.973	0.211	1.0	307461.3	1	3	639	64	
C8STORY1	W36X529	C8	STORY1	210	210 X	50	3	156 39600	2330	16	4	0.871	0.252	1.0	257012.6	2	2	744	74	
C8BASEMENT	W36X529	C8	BASEMENT	297	279 X	50	3	156 39600	2330	16	4	0.737	0.305	1.0	128493.2	1	1	920	92	
C8GRADEBM	W36X529	C8	GRADEBM	72	72 X	50	3	156 39600	2330	16	4	0.000	0.600	1.0	2186392	1	1	938	94	
C9PENTHOUSE	W36X330	C9	PENTHOUSE	192	192 X	50	3	97 23300	1410	15.5	3.83	0.515	0.394	1.0	180905.3	5	1	241	24	
C9STORY6	W36X330	C9	STORY6	192	192 X	50	3	97 23300	1410	15.5	3.83	0.906	0.238	1.0	180905.3	10	2	339	34	
C9STORY5	W36X395	C9	STORY5	192	192 X	50	3	116 28500	1710	15.7	3.88	0.903	0.239	1.0	221279	16	2	442	45	
C9STORY4	W36X395	C9	STORY4	232	232 X	50	3	116 28500	1710	15.7	3.88	0.919	0.232	1.0	151553.7	19	3	547	55	



Tributary Area



Dead
Line Load



BlueBeam

